DOCUMENT RESUME

ED 324 408 CE 055 823

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TITLE Vocational Education Effectiveness Indicators.
INSTITUTION Hawaii Univ., Honolulu. Office of the State Director for Vocational Education.
PUB DATE Sep 90
NOTE 42p.
PUB TYPE Information Analyses (070)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Achievement; *Achievement Rating; *Evaluation Criteria; Job Placement; *Outcomes of Education; Performance; Postsecondary Education; *Program Effectiveness; *Program Evaluation; Secondary Education; Standards; *Vocational Education
IDENTIFIERS Arkansas; California; Florida; Illinois; Kansas; Kentucky; Minnesota; Missouri; New York; Ohio; Oklahoma; South Carolina; Tennessee; Virginia

ABSTRACT

This paper provides an overview of some of the issues involved in developing and implementing vocational education effectiveness indicators and systems. The paper first discusses educational effectiveness indicator systems--with the emphasis on "systems" in contrast to individual effectiveness indicators taken alone--and stresses the need to create a coherent system. Policy issues related to indicator development and use are the next focus of the document, with cautions being given about indicators measuring the wrong outcomes and being used for the wrong reasons. The next two sections focus on the two types of effectiveness indicators: labor market outcomes as indicators of program performance and student learning outcomes as indicators of program performance. Examples of states using both types of measure are then provided. States that use the labor market approach include Missouri, Kansas, South Carolina, Florida, and Kentucky. States using student learning outcomes include Ohio, New York, Arkansas, and North Carolina. Alternative vocational education system effectiveness measures are then discussed. Examples of states that use effectiveness indicators that go beyond outcomes are Illinois, Oklahoma, Minnesota, Tennessee, and California. Finally, the Virginia approach is used as a model for a two-step approach to developing effectiveness indicators. A summary of the document points out the pitfalls in both labor market and student learning outcomes indicators but urges development of indicator systems as a step in improving vocational education. Thirty references are included in the document. (KC)

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Vocational Education Effectiveness Indicators

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Vocational Education Effectiveness Indicators

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September, 1990

Preface

Rapid technological changes in the workplace as well as intense international competition have focused national attention once again on the effectiveness of vocational education. Accountability has become a guiding principle in the way states have approached new ways to improve vocational education. Thus, systems to measure accountability (usually referred to as education indicator systems) have become a major "business" in the United States. Schools are expected to act like businesses, and account for their successes and failures; and though it has never been easy to apply quantitative measures to complex educational processes and outcomes, more and more schools systems have been doing just that.

Although outcome-based effectiveness measures are currently being emphasized, the literature cautions that ignoring explanatory indicators from input, school context/process or existing labor market conditions creates a potentially dangerous imbalance. There is concern that single indicators or even large numbers of indicators by themselves cannot disclose information about the complexity of the vocational education system. To address this problem, several states have begun the development of vocational education effectiveness indicator systems.

With the newly authorized Carl D. Perkins Vocational and Applied Technology Education Act mandating the development of effectiveness indicators, it is critical that vocational education leaders in Hawaii must be clear as to what vocational education should accomplish and then agree on a set of indicators/standards which are linked to attainable and worthwhile goals. Vocational educators must be involved on the front end of this operation because modifying indicators once the system is in place will be difficult.

This document provides an overview of some of the issues involved in developing and implementing vocational education effectiveness indicators and vocational education effectiveness indicator systems.

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Introduction

At least since 1983, when the Department of Education declared this was a "Nation at Risk" (U.S. Department of Education, 1983), nearly all of the states have begun implementing reforms: increased graduation requirements, more standardized testing, lengthening the school day and the school year, imposing sanctions for poor performance, and designing new teacher certification processes are the most common strategies (Office of Technology Assessment, 1990, p. 11). The public's view of the overall health of the education system or some more specific aspect of it such as vocational education is increasingly shaped by media reports. The complexity and pace of today's technologically advanced society works to limit first-hand involvement in the schools and promotes dependence on second-hand appraisals by interest groups, special commissions, politicians, and the press. The preponderance of such information focuses on the problems, not the successes, of the educational enterprise. The result is a renewed focus on educational outcomes, efficiency, and accountability--educational effectiveness indicators.

Accountability has become a guiding principle in the way states have approached new ways to improve education. Thus, systems to measure accountability have become a major "business" in the United States (Odden, 1990). Schools are expected to act like businesses, and account for their successes and failures; and though it has never been easy to apply quantitative measures to complex educational processes and outcomes, more and more school systems have been doing just that.

The Carl D. Perkins Vocational and Applied Technology Education Act was authorized at a time when performance incentives and quality indicators were very much in vogue. Early drafts of both the U.S. House and Senate versions of the new Act mandated the development of performance indicators and/or performance-based assessment and even delineated specific alternatives.

In its statement on the reauthorization of the Perkins Act, the National Association of State Directors of Vocational Education (NASDVE) called for a system of outcome measures to be applied through the occupational education system in order to continually evaluate the results of the programs (NASDVE, 1989). The recently completed National Assessment of Vocational Education (NAVE) recommended that each state develop performance indicators that would include information on academic achievement, vocational attainment and occupational skills, employment outcomes, and the continuity of student training between secondary and postsecondary levels (NAVE, 1989, xv).

Clearly, vocational education effectiveness indicators are being called for by the public, vocational education leaders, and members of Congress. The impending implementation of a nationwide and state-by-state system of education indicators may be an opportunity to provide more balanced and accurate information on education to the public and to educators themselves. Indicator systems may prove to be rich sources of information for educational improvement or may mask real problems and drive education toward unrealistic ends or unproductive use of scarce resources. David (1987) claims that two dangers are inherent in the use of indicators: (1) they will be used

and (2) they will not be used. In the first case, they may cause educators and the public to focus on the wrong things and in the second, the high costs associated with extensive data collection could represent lost opportunities.

Education Effectiveness Indicator Systems

According to Oakes (1986, p. 1), an education indicator "is a statistic about the educational system that reveals something about its performance or health." Smith (1988, p. 487) adds that an educational indicator "either assesses or is related to a desired outcome of the education system or describes a core feature of that system." Further, Smith adds, an educational indicator should provide information or data that is technically feasible to collect and is valid and useful for making policy decisions. Put more succinctly, the recent Rand report on educational indicators argues that an educational indicator is an "individual or composite statistic that relates to a basic construct in education and is useful in a policy context" (Shavelson, McDonnell and Oakes, 1989, p. 5).

However, single indicators or even large numbers of indicators cannot by themselves disclose something about the complexity of the vocational education system. An indicator system, in other words, is more than just a collection of statistics. An indicator system seeks to provide measures of various components of the vocational education system as well as information about how those components work together to describe the condition of the system and changes in the condition of the system over time.

An indicator system is far more than a time series of outcome measures, such as student achievement, postsecondary attendance rates, drop out rates, and lifetime earnings. Monitoring outcomes alone does not provide enough information to determine why changes in outcomes occur over time (Odden, 1990, p. 24). The goals of educational indicator systems are quite grandiose. An educational indicator system needs to provide information about core educational inputs, processes, and outcomes as well as have some sense of how these variables interact.

An education effectiveness indicator system, then, is composed of individual indicators which are studied for their own merit as well as their relationship with other indicators. These individual indicators, according to Asche, (1990, p. 4) should possess several characteristics:

An indicator may be an outcome, process, or input.

An indicator should be readily understood by a broad audience.

An indicator should measure something amenable to change by policy.

An indicator should measure something that can be compared across time or locations (Guthrie, 1987).

Oakes (1986) adds several desired characteristics:

Indicators should measure ubiquitous features of schooling--those dimensions that can be found throughout the system.

Indicators should measure enduring features of the system.

Indicators should be feasible in terms of time, costs, and expertise required to collect the relevant information.

Indicators should be generally accepted as valid and reliable statistics.

Policy Issues Related to Indicator Development and Use

Developing and using educational indicators raises several important issues and problems. From their study of practices across the 50 states, Kagan and Coley (1989) concluded that (a) there is a premature pressure to use education indicator results to hold local school systems accountable; (b) there is insufficient investment to insure high quality for all measures that become part of state indicator systems; and (c) there is a reluctance to make sense of the indicators, that is, to analyze relationships among inputs, processes, and outcomes for the purpose of recommending policy action.

While indicators have many potential or realized dangers, they also offer opportunities to prove and improve education. Asche lists the following positive aspects of education indicators (1990, p. 5):

> Locally developed indicators provide opportunities for school-based improvement and the development of shared goals and values (David, 1987).
>
> Indicators can serve as a political tool to influence the improvement of education by educators if they have input to indicator development, use, and interpretation. They could serve as a meaningful first step toward participation of teachers in setting education policy (Porter, 1988).
>
> Indicators can be useful in monitoring particular policies and practices (Oakes, 1986).
>
> Indicators based on what we know about effective instruction and conditions can be useful in school improvement (David, 1987).
>
> Indicators that are disaggregated according to relevant demographic, social, or educational variables have diagnostic potential.
>
> Indicators offer an opportunity for vocational education to be included in educational reforms which have to this point focused almost entirely on academic education.

Asche (1990, p. 5) points out, "indicators are neither evil nor virtuous in themselves" and makes the following observations:

> To the extent that we are not clear as to what vocational education should accomplish, we are left in a position of having externally imposed indicators and performance standards dictate vocational education's purposes and activities. The indicators selected for vocational education must be those which are linked to attainable and worthwhile goals or we will be in a position of using our resources to accomplish someone else's agenda.
>
> If vocational educators can propose and agree on a set of indicators/standards, we will be in the unique position of being able to influence policy toward desired ends.
>
> Selecting appropriate indicators is only half the picture. Vocational educators should assume a proactive stance in the collection, use, and interpretation of appropriate data that go to make up the indicator system. We have traditionally resisted data collection but the widescale implementation of indicators and performance standards will proceed, with or without our input.
>
> There will be a natural tendency to cut costs by using or adapting existing data and/or data collection mechanisms. This may or may not be appropriate but the choice and use of indicators should not be constrained by present practices.
>
> It will be very difficult to modify, add, or delete indicators once the system is in place. The expensive and complex mechanisms necessary to data collection, analysis, and dissemination will resist any change that will increase costs or be perceived as changing direction. It is therefore imperative that vocational educators be involved on the front end of this movement.

Vocational Education Outcome-Based Effectiveness Measurement Alternatives

While the literature emphasizes <u>systems</u> of effectiveness indicators, vocational education has, primarily, addressed specific outcome measurements. For example, the Carl D. Perkins Vocational Act required states to establish boards to review vocational curricula and their relevance to labor market needs, and specified that the boards must be composed to business and education leaders in the community

according to Federal guidelines. However, these outcome requirements did not include methodological guidelines, and they were not rigorously enforced. And they certainly did not measure the interrelationship of the many other components affecting vocational education programs.

Early versions of the Carl D. Perkins Vocational and Applied Technology Education Act included specific outcome measurements rather than systems of effectiveness indicators. Purportedly based on recommendations included in a study by the Office of Technology Assessment (1990), two outcome-based effectiveness measures were emphasized.

The first is based on labor market outcomes, which are intuitively appealing because they link important objectives of vocational education to the subsequent work experiences of program participants and graduates. Productive and gainful employment ranks high among the objectives of American education and is the traditional rationale for vocational education. Job placement, earnings, unemployment, productivity, and employer satisfaction are all assumed to be affected, to some degree, by the quality of an educational program.

The second type of measure is based on estimates of learning by students. Regardless of their labor market experience after school, how much students learn and in which subjects are important indicators of an educational program's quality. In fact, many people believe that testing of competencies is the single most important component of performance measurement (Office of Technology Assessment, 1990, p. 19).

The Office of Technology Assessment report recognizes that job-related competencies and subsequent labor market success are not the only effectiveness indicators of successful vocational education programs. The 1990 report suggests that other measures that could be included in a comprehensive performance evaluation are noneconomic effects of vocational education such as job satisfaction and family stability and reduction of the dropout rate and participation in postsecondary education. The examples above are outcome measures with little or no provision for explanatory indicators from input, school context/process, or existing labor market conditions.

Since early versions of the Carl D. Perkins Vocational and Applied Technology Education Act focused on labor market and student learning outcomes, an examination of what states are currently doing to measure these two outcome-based effectiveness indicators seems pragmatic.

Labor Market Outcomes as Indicators of Program Performance

Economists have studied the impact of vocational education on earnings, hours worked, unemployment and other labor market outcomes for many years. Their research typically relies on survey data that tracks the educational and employment experiences of large numbers of high school students over several years. These studies have attempted to address the general economic question--does vocational education pay?--but the data they have relied on can provide limited information about the relative quality of specific vocational programs. While

interesting, these studies do not ascertain whether students in a given school program experience subsequent labor market advantages as compared to students who are not in that program.

According to an Office of Technology Assessment study (1990), 27 states use follow-up surveys to collect data on job placements of graduates, which in many cases includes information on wages, job tasks, and employers' views of employee job performance. These follow-up surveys are typically conducted 9 to 12 months after the student has left school and data are generally collected by district personnel and/or teachers.

The following are examples of states with comprehensive labor market outcome assessments:

Missouri. Since 1985, approximately 37 percent of Missouri's state funds for vocational education have been distributed to programs according to scores on two factors: 1) how well programs train students for jobs in areas of high market demand (demand is estimated from rankings prepared by the Missouri Occupational Information Coordinating Committee in cooperation with the division of Occupational and Adult Education of the Elementary and Secondary Education Department, using employment projections prepared by the State Employment Security Agency), and 2) placement of students in jobs related to training. Local placement performance is accepted as sufficient justification to continue a program that is identified as being of low priority using this ranking procedure. A bonus is offered for placing hard-to-serve students. The State provides districts with information regarding the dollar value of each of their

programs based on the above two factors, thereby giving districts information needed to make maintenance or cancellation decisions.

Kansas. Kansas requires that 50 percent of its vocational education graduates find jobs related to the field in which they were trained. Students who have dropped out in the 11th or 12th grades can be counted as placements if the jobs are in the area of training. Programs that do not meet the 50 percent requirement are placed on probation and have 3 years to raise their rate. During those 3 years, the program receives technical assistance from the State Education Department, and if a 50 percent placement rate is still not achieved, support is discontinued. Less than 5 percent of the programs in Kansas have failed to meet the standards.

South Carolina. South Carolina uses both positive and negative incentives to influence vocational education. The 50 percent placement requirement means that one-half of all students who complete defined courses are expected to find jobs. This requirement is different from those in effect elsewhere that are based on program, school, or district completions. Placements must be in the area of training and attendance at a postsecondary institution must also be in the area of training. South Carolina also includes dropouts in its count of successful placements if they obtain jobs in the area of training. Placement rates are verified by the State, and involve pulling of records, visits to employers, and interviews with employers and graduates regarding wages and employee satisfaction.

An average of seven programs have been discontinued in each of South Carolina's 92 districts over the past 4 years. Discontinuances

are reported to be based primarily on decline in labor market demand rather than on inadequate program quality. For example, programs in body and fender and building construction have been discontinued because of low placement rates.

Florida. Florida's legislature enacted a placement rate requirement of 60 percent in 1983-84, then raised it to 70 percent in the next year. Programs that fail to meet the standard are automatically reviewed by the Florida State Department of Education, which then submits the review to a regional coordinating council along with a plan for improving the placement rate for that program. As of the 1985-86 school year, any program in which the placement rate for completers was less than 70 percent for 3 consecutive years was ineligible for state funding. To compensate for adverse economic or demographic conditions, the Department of Education was given the authority to adjust placement rates at the regional level using a statistical method approved by the State Boards. Adjustments must be reviewed by the Legislature before submission to the State Board.

Florida's unemployment rate for youth in 1987 was 16.1 percent. The placement requirement of 70 percent established the expectation that completion of a vocational program should increase the likelihood of job placement by approximately 14 percent over what would occur without special training.

Data on placements is collected at the local level, generally by the vocational program teacher with the assistance of a placement specialist. This data is then forwarded to the district and on to the State. The Florida Legislature specified that audits of accuracy

regarding placement rates are to be conducted by the Office of the Auditor General of Florida, although none have been conducted as yet. Florida's response rate on these followup surveys has increased from 62 percent in 1982-83 to 89 percent in 1985-86.

Florida is moving to a statewide system for tracking individuals who complete vocational programs. This system draws from employment data, postsecondary enrollment, and national military records, and uses students' social security numbers as identifiers. Once this data is collected, it must be returned to the local education agencies, who then determine whether or not the placements are in areas related to training.

Florida has defined a vocational completer as a student who has completed a specified course of study and exhibits mastery of designated competencies. Exceptional students are not included in the computation of program placement rates if they do not meet these criteria. Also excluded from the computations are prison inmates, nonresident aliens, or aliens who are in the United States on nonimmigration visas. Students who are not located are counted as nonplacements.

In 1983-84, 45 percent of the total programs were required to receive a modified program review, because they had not met the placement-rate standard. This rate dropped to 14 percent during the next 2 years. The numbers of students (both secondary and postsecondary) who were designated as having completed vocational programs declined by almost 12,000 during this same period. Possible reasons are that schools either are being more cautious about who

qualifies as a completer, more selective regarding who is permitted to enroll in a vocational program, or that fewer students are electing to enroll in vocational programs. In addition, these same data show that, while placements in employment related to training increased, placement in continuing education and full-time military dropped substantially. No studies have been conducted to identify possible explanations of these trends.

Kentucky. The Kentucky Bureau of Vocational Education has been operating a comprehensive system for placement and follow-up of vocational students since the mid seventies. The follow-up component is divided into four categores: the Initial Follow-Up, Employer Survey, Program Improvement Follow-Up and Two-Year Student Follow-Up for program completers. The placement component (marked "Optional" in a packet of materials received from the Kentucky Bureau of Vocational Education) is designed to be comprehensive to the point that "assistance may be provided for any student or former student of vocational education striving to achieve a new level on the career stair case." The placement service is seen as a way to put vocational educators in contact with key individuals throughout the community and to identify potential employment to the student and former students.

Student Learning Outcomes as Indicators of Program Performance

The second outcome-based effectiveness indicator measures student learning. The Office of Technology Assessment (1990, p. 46) claims that "what students learn in school is at least as important an

indicator of program quality as how well they do in the labor market after graduation."

In vocational education, student learning outcomes have generally been measured through competency-based testing. The Office of Technology Assessment (1990) cautions that two key assumptions must be made concerning the use of competency tests to measure student learning outcomes. The first assumption concerning competency tests is "that the knowledge and skills they measure are correlated with one or more of the objectives of vocational education." The second assumption is that the use of competency tests provides information about the effects of school programs.

According to a recent survey, 13 states are engaged in testing the occupational competencies of vocational and technical students and 7 states are in the process of developing competency tests for vocational students. An additional 11 states are considering development, and 20 have indicated that they have no plans to initiate statewide vocational competency testing (Love-Wilkes, 1988).

Some states are beginning to adopt national standards established by certain industries. For example, Oklahoma has adopted the Associated General Contractors of America standards for its vocational construction programs. Likewise, Georgia has adopted the Printing Industries of America, Inc. graphic arts certification standards for its programs. Some other national industry-sponsored worker certification programs are offered by the following organizations: National Automotive Technicians Education Foundation, Air Conditioning and Refrigeration Institute, Institute for Certification of Computer

Professionals, American Medical Technologists, and Electronics Industries of America.

Many states have formed consortia to pursue the development of competency-based curricula and tests in a cost-effective manner. Although several of these consortia only produce occupational tests, some also produce materials that list the duties, tasks, and tools needed for a broad range of jobs. Often these materials are based on detailed job analyses conducted by small groups that include vocational educators, experts currently working in the job, and/or by representatives of associations that represent the profession with which the job is identified. In some cases, tests are then developed to reflect the duties, tasks, and skills identified through these job analyses and packaged into tests or made available to States, schools, or districts in the form of banks of items. Educational agencies "buy into" these item banks, and can then select those items that match their vocational programs. Often, States purchase the test banks and make them available to local education agencies, who can then customize the tests to match their local curricula.

While these types of tests can provide more accurate information about program quality than tests of generic abilities, they are more time-consuming to develop. It is possible that by the time a test is administered, the skills it measures are obsolete. In addition, because they emphasize proficiency at highly specific occupational skills, these tests could discourage educators from exploring ways to teach broadly applicable skills that could benefit students in the long run. Another concern in competency testing is cognitive

complexity. Some skills or concepts are more complex than others and therefore more difficult to measure.

These and other similar concerns have resulted in the application of various types of tests, each of which has its own inherent tradeoffs. Occupational competency tests assess skills (tasks) and knowledge found in specific jobs and are different from tests of academic competency and tests of employability skills (e.g., knowing how to conduct a job search, completing a job application, or exhibiting acceptable work habits.) These tests may be paper and pencil objective tests, paper and pencil subjective tests, portfolio assessments, or performance tests. Each of these assessment modes has strengths and weaknesses. While performance testing is generally more faithful to the actual task as performed in a job situation, it is costly to administer (Office of Technology Assessment, 1990, p. 56).

The following States' efforts in competency testing may be categorized as examples of student learning outcomes as indicators of program performance:

Ohio. The Ohio Vocational Assessment program is a joint venture between the Ohio Department of Education's Division of Vocational and Career Education and the Instructional Materials Laboratory at Ohio State University. The Instructional Materials Laboratory (IML) derives test items from an analysis of the duties and tasks involved in each occupation. These duty and task lists are developed by committees comprised of vocational teachers, state education staff, and a nonteacher member of the occupation. In addition, industry representatives throughout the state are surveyed for their comments

on the task lists. Mathematics, science, and communications competencies relevant to the occupational competencies are included in the task analyses published by IML. Tests are comprised of two parts with approximately 175 questions for each part, averaging about one item for each task level. Performance tests are not a part of the IML testing effort.

The tests are designed for use by teachers, supervisors, and administrators for evaluation and diagnosis of vocational achievement for the improvement of instruction. Although participation in the testing program is voluntary, almost all eligible secondary schools in Ohio are involved.

New York. The New York State Department of Education provides occupational competency tests to assess students' mastery of selected vocational coursework. Currently, these tests are primarily used for entry-level courses. The Department is, however, in the process of developing additional competency tests. Students must pass the tests as one of several requirements for high school graduation. The tests contain only multiple choice, primarily knowledge-based items, and do not measure students' abilities to perform job-related tasks.

Arkansas. The Arkansas Vocational-Technical Education Student Competency Testing (SCT) Program is a competency-based testing program for students in secondary and postsecondary courses thoughout the state. The SCT Program completed its fourth year of testing in May 1990 with the participation of 24 postsecondary schools and over 300 secondary schools. Tests were generated for courses from Agriculture Education, Business Education, Marketing Education, Health Education,

Home Economics Education and Trade and Industrial Education. The results of the tests are printed and mailed to each school. Instructors and administrators are encouraged to examine the reports to determine how individual classes are performing in relation to similar students statewide, how individual students are performing overall, and how students are performing on a given item. Because the items are coded to a specific task within each course, instructors are able to determine how students are performing at the task level. Instructors are encouraged to examine their own teaching of a task in light of student performance.

North Carolina. To obtain valid and reliable information regarding the status of student performance in each vocational course and program, North Carolina has implemented the Vocational Competency Achievement Tracking System (VoCATS). VoCATS is a competency-based instructional management system which allows the collection of data on student performance achievement prior to, during, and following instruction. Data are in the form of competency mastery status, pre- and post-test scores, and gain scores. A complete VoCATS curriculum package for each vocational education course would include a core competency listing in weighted course/test blueprint format, a computer-managed competency/test-item bank, a curriculum guide with detailed content outline and suggested learning activities for students, and a competency-based equipment, materials and supplies list.

National Occupational Competency Testing Institute (NOCTI). At the present time, 47 states, and the District of Columbia participate

in NOCTI, and 23 states use NOCTI tests for certifying vocational teachers. Both written and performance tests are used to assess each occupation with tests covering factual knowledge, technical information, understanding of principles, and problem-solving abilities. The performance tests are administered in a laboratory, industrial, or clinical setting and consist of work assignments that require 2 to 5 hours to complete. NOCTI tests are only available for use at the end of a program, not for ongoing assessment during an instructional program.

Vocational Education System Effectiveness Measurement Alternatives

Oakes (1989) and others have argued that effectiveness indicators should go beyond outcomes and include information on school context to monitor schooling resources and processes. She cautions against "outcome only" systems since there is a tendency to narrow programs to "look good" on such limited outcome indicators. The argument for effectiveness indicator <u>systems</u> is that outcome indicators in isolation do not provide information on how or why such outcomes are produced or what to do if results are judged unsatisfactory.

With this concern in mind, several states have implemented or have under development indicator systems for vocational education. Asche (1990, p. 9) claims that while there is variation in how states have defined specific terms (indicators, quality indicators, performance standards, etc.), the primary way in which the approaches

vary is in terms of the level of specificity of the indicators, the level at which the data are collected and used (local vs. state), and the primary purpose of the system (self-assessment/improvement vs. accountability/control).

The following are examples of states with vocational education effectiveness measurement systems:

Illinois. A three-stage self evaluation is the key to the Illinois system. This self evaluation is enhanced by the use of a computerized "expert system." A branch of artificial intelligence, expert systems technology combines human expertise with programming logic to develop a computer program which can solve problems in a specific knowledge domain.

The first stage of the system, assessment of basic indicators, provides a quick picture of the general status of the program. Stage 2, in-depth analysis, provides a detailed investigation of problems identified in the first stage. Stage 3, program improvement planning, uses the expert system to display a list of potential problem solutions in response to the problems identified in Stage 2.

The basic indicators are the foundation of the system. Seven basic indicators were selected after extensive statewide and national research to determine "What constitutes a quality vocational education program?" The seven basic indicators are:

1. Placement/Continuing Education: assesses the post-program employment or educational status of program completers.

2. Student Satisfaction: measures current and former students' perceptions of program content, instruction, material, and services.

3. Employer Satisfaction: determines employers' perceptions of how well the program prepared former students who are now in the work force.

4. General Employability Skills: tests students' attainment of those non job-specific skills and abilities necessary for success in the work world.

5. Enrollment: gives a picture of the current status and trends in program enrollment.

6. Cost: determines the relative expense of a program.

7. Labor Market Justification: explores labor market databases to assess supply of and demand for workers in specific occupational areas, so that programs may be planned accordingly.

In addition to the self-evaluation component, the overall, or "macro" system contains provisions for evaluation assistance, verification of evaluation data, and assessment of such "global" program features as leadership, administration, student services, labor market data, and special needs services.

Oklahoma. The Oklahoma system is an example of an approach where general minimum program standards are specified instead of more specific "quality indicators" (Oklahoma State Department of Education, 1989). This approach follows from the accreditation type evaluation systems in place in most states. The twelve "standards" in Oklahoma are (1) Instructional Planning and Organization, (2) Instructional Materials Utilization, (3) Qualified Instructional Personnel, (4) Enrollment and Student Teacher Ratio, (5) Equipment and Supplies, (6) Instructional Facilities, (7) Safety Training and Practices, (8) Program Advisory Committee and Community Relations, (9) Vocational Student Organizations, (10) Coordination Activities, (11) Vocational Student Accounting and Reports, and (12) Adult Education.

Asche claims that accreditation-type evaluation approaches are liable to be focused primarily on "intrinsic" characteristics of the program such as faculty qualifications, up-to-date equipment, etc. While these have proven to be valuable indicators to insure minimum

levels of program quality, they do not guarantee that certain desired outputs or outcomes are achieved. The strong emphasis of the current reform movement is on outcomes of programs so intrinsic standards will probably not, in themselves, suffice.

It should also be noted that Oklahoma offers one of the most advanced competency-based curriculum and testing systems in the country (Office of Technology Assessment, 1990, p. 65). Thus, Oklahoma also provides an example of using student learning outcomes as an indicator of program performance. The Oklahoma system presently boasts of test batteries for 168 occupations, each of which consists of three types of tests (multiple choice, scenario, and performance). These tests are not required, but the State Department of Education makes them available to local programs for use in evaluating students' mastery of competencies and for identifying strengths and weaknesses in curriculum and instruction. More than half of the schools in Oklahoma use the tests in some way.

Minnesota. Ten potential vocational education indicators are currently being studied for use in Minnesota (Copa and Scholl, 1983). These indicators are (1) Employer satisfaction with quality of graduate's work, (2) Number of graduates employed in occupations related program, (3) Projected job openings in occupations related to program, (4) Number of graduates employed, (5) Occupations for which program is designed to provide training, (6) Performance of enrollees in program, (7) Availability of qualified staff and/or facilities, (8) Satisfaction with present job, (9) Program cost, and (10) Employer's satisfaction with graduates' personal characteristics in relation to work.

Tennessee. In Tennessee, performance-based outcomes are linked to funding in higher education. While this model is not a "system", it is more comprehensive than either labor market and/or student learning outcome measurement. In this 10-year-old system, performance standards have been adopted in six areas: (1) program accreditation, (2) major field assessment, (3) undergraduate general education outcomes, (4) alumni satisfaction surveys, (5) corrective measures, and (6) development and piloting of assessment instruments. These performance standards employ measures that vary considerably in their degree of objectivity, ease of measurement, and cost of collecting, maintaining, and reporting (Hoachlander, 1989). Although participation in the system is voluntary, all eligible public universities, community colleges, and technical institutes in Tennessee participate (Hoachlander, 1989).

California. While not a system for vocational education in particular, the California education indicator initiatives are seen as a model in the United States. Although policy imperatives have been the major factors behind many of its indicator projects, over the years California also has created a data infrastructure that allows it to produce indicator systems. There presently exists a comprehensive school-by-school data system that can provide detailed information on students, teachers, school context, and curriculum, instruction, and student performance. These kinds of data constitute the backbone of a school-based education indicator system. Odden (1990, p. 27) acknowledges that few states have a data system as detailed as California and thus are limited in the degree to which they can create an educational indicator system.

The three state-initiated indicator projects include (1) Quality Indicator Reports, (2) an expanded student testing program, and (3) Proposition 98 School Report Cards. Quality Indicator Reports identify targets for system improvement but fall short of representing a full indicator system as several sets of both input and process variables are not included. Nevertheless, the Quality Indicator Reports launched the state on a path of reporting not only several key outcomes but also several key process variables ostensibly related to, and perhaps even causing, those outcomes. The California Assessment Program has been in effect for over 15 years but by the 1990-91 school year the full battery of tests will be in place and is expected to give California one of the most comprehensive and advanced student-testing programs in the country (Odden, 1990). The third indicator, School Accountability Report Cards, consists of a 13-area assessment which the Rand report suggests should constitute the core variables for a full-fledged educational indicator system (Shavelson, McDonnell, and Oakes, 1989).

Developing Effectiveness Indicators: The Virginia Approach

Vocational education leaders in Virginia have attempted to address the potentially dangerous emphasis on outcome measures, with little provision for explanatory indicators, by approaching the task of effectiveness indicator development and implementation as part of a comprehensive system of vocational education evaluation, planning, and program improvement. To capitalize on the potential benefits to be derived from effectiveness indicators and minimize the potential

liabilities to programs and students, Virginia vocational education leaders are recommending the following two-step approach to indicator development.

Effectiveness Indicator Development: Step One

1. Carefully review those indicators that have already been proposed for vocational education. Prepare a critique using appropriate criteria and the steps proposed below for developing "new" indicators. Share this critique with appropriate local, state, and national education authorities.
2. Clarify the central purposes (goals) of vocational education by level (secondary and postsecondary). These purposes should be those that apply to all vocational program areas. It is essential that vocational educators agree on what is to be accomplished by vocational education in order to have a positive program to present to external parties who may want to dictate the mission and role of vocational education in the overall educational system.
3. Implement a program to develop and justify a tailor-made indicator system. Vocational teachers and administrators at the high school, community college, and university level, state vocational education officials, business and industry representatives, and vocational education professional organization representatives should be involved in a meaningful way.
4. Implement a deliberate plan to influence school and state education officials to adopt the best aspects of the existing

system and minimize the potential for damage from the use or misuse of inappropriate indicators (Asche, 1990, p. 12).

Effectiveness Indicator Development: Step Two

The following recommendations are made for the systematic development of a "Virginia Specific" set of effectiveness indicators, but they appear to have merit for Hawaii.

1. View the task as one of developing a "system" which includes outcome indicators rather than developing indicators in isolation from other evaluation, planning, and program improvement needs. This indicator system should include four components:
   a. Appropriate outcome indicators to be used as a preliminary assessment of vocational education performance,
   b. A mechanism (methods and data) for an in-depth analysis in those areas where outcome indicators reveal unsatisfactory or marginal performance,
   c. A long-range program improvement planning process which is based on (a) and (b), and
   d. A plan for continuing assessment of the validity, reliability, and usefulness of the indicators and explanatory data elements.

   This system should be implemented on a statewide basis and should include provision for a minimum set of statewide indicators as well as provision for development of local and/or regional indicators to be used only at those levels.

2. Before agreeing on any given basic effectiveness indicator (single or composite statistic), identify or define at least the following:

   a. Validity of the indicator in terms of the agreed-upon purposes or goals of vocational education in Hawaii.

   b. Specific data requirements and sources for the indicator. Assess the feasibility and cost of obtaining reliable data.

   c. Usefulness of the indicator for providing guidance to program improvement and/or in summative evaluation.

   d. Standards/benchmarks for determining satisfactory performance on the indicator or the methods to be used to determine such standards.

   e. Related variables and data elements that would help explain performance on the indicator and the feasibility of obtaining such data.

3. After screening each proposed effectiveness indicator with (a) through (e) above, select a minimum set on which to begin implementation of the system. Develop a rationale for each indicator including the specification of the most promising explanatory variables and data (In most cases, these would include school context variables such as student and program characteristics, process variables, and relevant external variables, particulary labor market information) (Asche, 1990, p. 13).

The last ingredient in an effectiveness indicator system is analysis. Analysis is critical; it makes sense of the data, explores

relations among the inputs, processes, and outputs of the education system, and makes policy recommendations for change. This analysis, which Odden (1990) claims is often missing, must be protected: it needs to be policy-relevant, it needs to be substantively sound, and it needs to be able to "call the shots" as the data and analytic findings suggests. To accomplish this purpose, it needs a strong measure of independence from the cross-currents of political pressures. It is critical that the data collected be analyzed if effectiveness indicators are to help improve, not just prove or discredit vocational education.

Summary

When the 101st Congress considered the reauthorization of the Carl D. Perkins Vocational Education Act, one area of debate centered on establishing effectiveness indicators for vocational education. Two outcome-based effectiveness measures were emphasized. The first is based on labor market outcomes and the second is based on estimates of learning by students (learning outcomes). This second measure is generally linked to competency-based curriculum and learning.

Labor market outcomes are currently measured via follow-up surveys of vocational education graduates in 27 states. Tyically conducted 9 to 12 months after the student has left school, the follow-up surveys often collect information on wages, job tasks, and employers' views of employee job performance.

Because one of the primary objectives of vocational education is productive employment, how vocational program graduates fare in the labor market can be an important reflection of the programs from which they graduated. However, the Office of Technology Assessment study (1990, p. 5-6) claims that labor market indicators alone are an insufficient basis for performance standards for the following reasons:

> It will always be difficult to isolate the specific effects of school programs from the geographical, demographic, and other nonschool factors that determine individual success in the labor market, and it is prohibitively costly to collect and analyze the detailed student background data that would be necessary to overcome this problem. Alternative solutions, such as conducting controlled experiments or using sophisticated statistical correction methodologies, are not practical.
>
> The use of some labor market indicators could distort school behavior: placement rates, for example, especially if used as the basis for sanctions or rewards to schools, could induce schools to concentrate too heavily on coaching students in job search and interview skills at the expense of teaching vocational competencies that would benefit them in the workplace.
>
> Ideal labor market indicators would include information on items not currently part of the wage records system, such as participation in employer-sponsored training, measures of employee morale, job performance, and productivity. These types of information are difficult and costly to obtain.

The second outcome-based effectiveness indicator measures student learning. It would be difficult to argue against the claim that what students learn in school is at least as important an indicator of program quality as how well they do in the labor market after graduation.

According to a 1988 survey, 13 states are engaged in testing the occupational competencies of vocational students and 7 states are in the process of developing competency tests for vocational students.

An additional 11 states are considering development of statewide vocational competency testing systems (Love-Wilkes). In addition, many states are adopting industry developed standards or certification competencies such as the Electronics Industries of America national standards for television technicians.

Competency tests, like labor market outcomes, provide important but insufficient indicators of program effectiveness according to the Office Of Technology Assessment study. The study lists the following reasons why student learning outcomes should not become the sole basis for performance standards (1990, p. 7-8):

> It is never possible to know exactly how much of an individual's developed abilities can be attributed to a school or program. Accurate interpretation of test results requires a high level of sophistication in accounting for socioeconomic and other correlates of test performance.
>
> Depending on the types of test used (e.g., multiple choice) there is a risk that schools will coach students on test-taking strategies and on specific test items at the expense of teaching the skills and concepts purportedly measured by the tests.
>
> Most tests are designed to measure the upper limit of what a person can do, and do not necessarily indicate how a person would typically perform at work.
>
> There are too many different occupations taught in American schools for there to be a viable national competency test. In addition, tests that accurately assess what is taught in specific courses could encourage excessive emphasis on highly specialized skills at the expense of more broadly applicable generic skills. There is a growing consensus that the pace of workplace innovations will require flexibility: for example, many people have argued that vocational graduates need "learning-to-learn skills" and the ability to work effectively in teams, as well as job-specific proficiencies.

While effectiveness measures based on labor market indicators or competency attainment scores are useful, neither can fully capture the complex goals of vocational education. Oakes (1989) and others have argued for indicator systems that include information on school

context to monitor schooling resources and processes. She cautions against "outcome only" systems since there is a tendency to narrow programs to "look good" on such limited outcome indicators. Outcome indicators do not provide information on how or why such outcomes are produced or what to do if results are judged unsatisfactory (Asche, 1990, p. 11).

Single indicators or even large numbers of indicators cannot by themselves disclose something about the complexity of the vocational education system. A vocational education effectiveness indicator system, on the other hand, would provide information about core educational inputs, processes, and outcomes as well as have some sense of how these variables interact.

With these concerns in mind, several states have implemented or have under development indicator systems for vocational education. In Illinois, for example, seven "vital signs" are evaluated to determine the effectiveness of the vocational education system. Each of these seven vital signs is a composite of several data elements. For example, "student satisfaction" is a composite of students' satisfaction with program content, quality of instruction, instructional resources, student services, preparation for employment or further education, instructional methods, and employment information.

Vocational education leaders in Virginia have attempted to address the potentially dangerous emphasis on outcome measures by approaching the task of effectiveness indicator development and implementation as part of a comprehensive system of vocational education evaluation, planning, and program improvement. Their

two-step approach (outlined in the body of this document) provides a model for other states interested in the judicious development of a vocational education effectiveness indicator system.

The implementation of a nationwide and/or state-by-state system of education effectiveness indicators may be an opportunity to provide more balanced and accurate information on education to the public and to educators themselves or it may provide even greater power to shape information by education's detractors. Indicator systems may prove to be rich sources of information for vocational education improvement or may mask real problems and drive vocational education toward unrealistic ends or unproductive use of scarce resources. A few cautions about effectiveness indicator development include:

> Indicators tend to measure quantity, not quality (Porter, 1988; David, 1987).
>
> Indicators are designed to serve policymakers, not educators. Teachers are typically excluded from input to their development, use, and interpretation (Porter, 1988).
>
> Indicators aim for parsimony, not complexity--the danger exists of radical oversimplification of the education process (Porter, 1988).
>
> Indicators tend to reflect those things that can be easily measured, not necessarily those that should be measured (Asche, 1990).
>
> Without reasonable agreement on what (vocational) education goals should be, indicators serve to determine what education will become. Thus, indicators will shape the curriculum (Oakes, 1986).

There are, afterall, as David (1987) claims, two dangers inherent in the use of effectiveness indicators: (1) they will be used and (2) they will not be used.

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